Kingfish Battle Notes:

Fundamental Errors in Fire Coordination Graphics

by Major Thomas A. Kolditz and Colonel Neil E. Nelson

***Editor's Note:** This article is the second in a series of "Kingfish Battle Notes," discussing fire support tactics, techniques and procedures in the 101st Airborne Division (Air Assault). The first article, "RAIDS—Fire Coordination for Aviation in the Deep Battle," appeared in the February 1995 edition. "Kingfish" was the code name of the 101st Airborne Division Artillery during World War II. The white bomb painted on the side of a helmet also signified a soldier was from the division artillery.*

The fire support officer (FSO) was fuming. He had just "lost five pounds" during a one-minute, one-way conversation with the fire support coordinator (FSCOORD) over clearance for counterfire. The FSO's frustration was that the issue was not with his fire support overlay, but with the way the boundaries were established on the higher headquarters graphics.

The rather nontechnical terminology used at high volume by the FSCOORD did not seem to capture the problem. The FSO had just discovered that you can't fix bad graphics with permissive fire support coordination measures (FSCM). He also had discovered an important doctrinal fact—boundaries are the most basic fire coordination measure and, therefore, require his personal attention while formulating the plan.

The FSO needed both the ability to recognize the overlay problem and the terminology to communicate the problem to the FSCOORD. This article attempts to establish common terminology for errors in fire coordination graphics and suggests there are six fundamental errors that contribute to most fire coordination problems. The goal of this article is to make common mistakes easier to recognize and, once found, easier to discuss.

We've got to get beyond assuming that graphics will be flawless before they're issued or fought. Ideally, graphics stand alone as representative of the plan and, in the hands of an experienced operator, amplify the order. Sometimes, however, confusion arises as to exactly what action the graphics were to portray. Planners intimately familiar with the plan and enthusiastic about its execution miss a detail of key importance to someone less familiar with their ideas. During crisis action or contingency planning, simple haste may cause mistakes that go undetected. It's up to fire supporters to detect these mistakes—*before* a call-for-fire.

The coordination of direct and indirect fires is a complex art, and there are many ways to assist execution with boundaries and other FSCM. Fundamentally, however, there are only six types of mistakes or errors in fire coordination graphics. The term "fundamental" was chosen because each error has to do with the basics of portraying space with lines. As a test, each error must apply to both boundaries and those lines more commonly thought of as FSCM—coordinated fire lines (CFLs), fire support coordinating lines (FSCLs) and restricted fire lines (RFLs).

All the figures in this article are based on actual graphics published by a division, brigade or battalion headquarters. If fire supporters check maneuver graphics looking for the following six fundamental errors, the vast majority of problems in clearing and otherwise coordinating fires will diminish.

1. Insufficient Coordination Space. Insufficient coordination space is when FSCM create corridors or other limited areas within which fires must be cleared (see Figure 1). The size varies with terrain. When you add the range probable error (PE) of the weapons system, likely target location error (TLE) and self-location error of friendly forces, it becomes clear why graphics that define one- or even two-kilometer corridors can cause problems in the safe, rapid coordination of fires. Figure 1 illustrates the point of vulnerability that can exist between measures and shows a way to correct it.

2. Mal-Assigned Coordination Space. Mal-assigned coordination space is when a graphic is labeled in such a way that it's unclear who is controlling (and, therefore, clearing) terrain (see Figure 2 on Page 44).

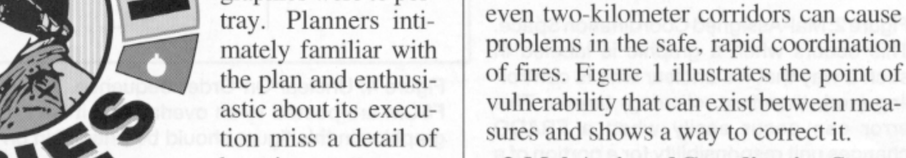

Figure 1: Insufficient Coordination Space. This error occurs when FSCM create corridors or other limited areas within which fire must be cleared.

This sounds like an obvious mistake, but it can occur easily when a fragmentary order (FRAGO) changes unit responsibility for a portion of a zone. Labeling errors also can cause problems in assigning responsibility for terrain.

Careful rehearsals help uncover this error and many other fire coordination problems. Caution: without care, rehearsal participants may focus only on a terrain model and not the graphical overlay from which they'll fight the order.

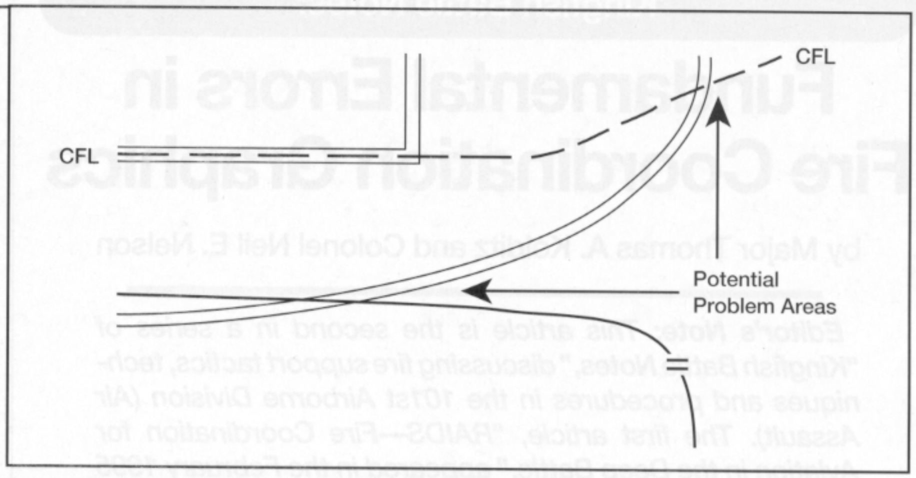

Figure 3: Key Feature Disadvantage. Because FSCM often are drawn (correctly) in relation to (but not necessarily on) visible terrain features, this error is easy to make. In this case, both a boundary and CFL parallel a high-speed avenue. The fix is to displace them to provide unambiguous responsibility for key terrain.

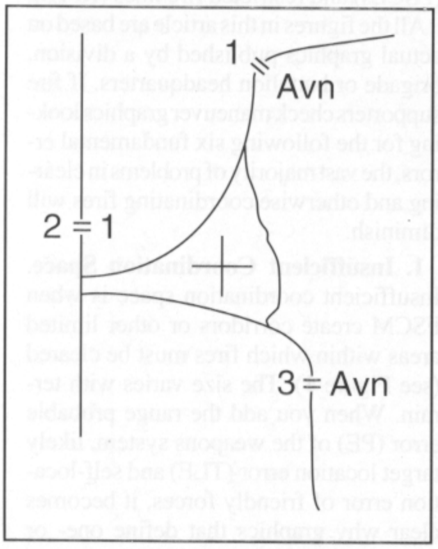

Figure 2: Mal-Assigned Coordination Space. This occurs when a graphic is labeled in such a way that it's unclear who is controlling (and, therefore, clearing) terrain. This error can occur easily when a FRAGO changes unit responsibility for a portion of a zone.

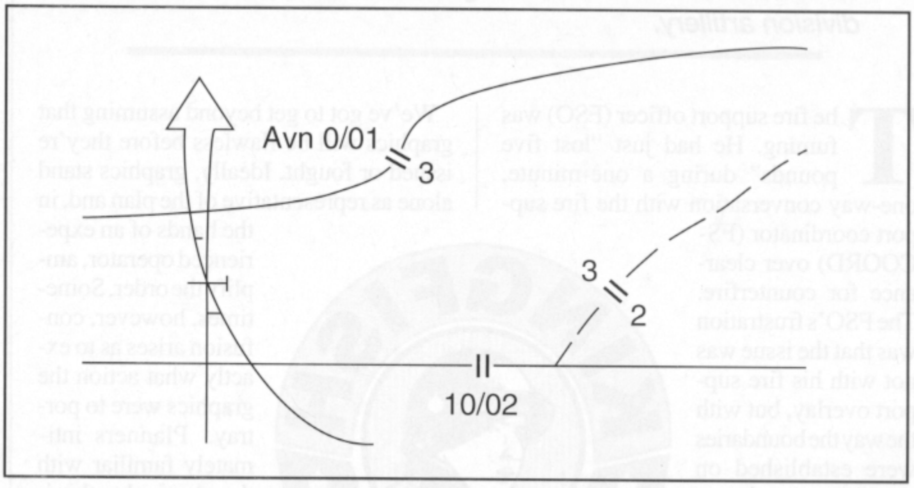

Figure 4: Unclear On-Order Sequence. This error is created when more than one on-order FSCM are posted to an overlay and it isn't obvious which is in effect at a given time. The graphics in this figure should be phased in on at least two overlays.

3. Key Feature Disadvantage. A key feature disadvantage is created when an FSCM overlays terrain on which the enemy is likely to be engaged (see Figure 3). This error is easy to make because FSCM often are drawn (correctly) in relation to (but not necessarily on) visible terrain features. For example, light forces often use battle tracking or "anti-fratricide" overlays that segment the battlefield using visible terrain features, such as roads and streams. When possible, however, boundaries and other FSCM must give responsibility for likely enemy positions or avenues of approach to a single commander to simplify the coordination of fires.

The graphical measures in Figure 3 (in this case, both a boundary and a CFL) parallel a high-speed avenue. The fix is to displace them to provide unambiguous responsibility for the key terrain feature, in this instance a road.

4. Unclear On-Order Sequence. Unclear on-order sequence is created when more than one on-order FSCM is posted to an overlay and it isn't obvious which is in effect at a given time (see Figure 4). Because CFLs and FSCLs are labeled with effective date-time-groups, this error most often occurs with boundaries. It's particularly likely to occur when multiple phases are placed on a single overlay, ostensibly to simplify distribution. In reality, though, distribution problems are easier to fix than fire coordination problems.

5. Inaccurate Posting Techniques. Ideally, fire coordination graphics are defined in eight-digit grids, point-to-point in a detailed operations order (OPORD). This enables accurate posting and rapid input to the tactical fire direction system (TACFIRE). Because maneuver boundaries are the most basic FSCM, when time permits they should be held to the same standard.

In practice, fires are cleared from a map through an overlay—particularly true in the case of branches, sequels or FRAGOs to a base plan. This encourages the use of the finest, most accurate pens possible on overlays used to clear fires (see Figure 5).

While most fire support NCOs index FSCM from the center of a line, points underneath a swath of black paint pen are ill-defined and almost impossible to efficiently clear. A 36-inch length of broad paint pen on a 1:50,000 map overlay creates approximately 28 square kilometers of ambiguous battlespace. Imagine how worthless such graphics are at 1:100,000 or 1:250,000.

If forced to use a wide pen, the fire supporter should draw the graphics first with

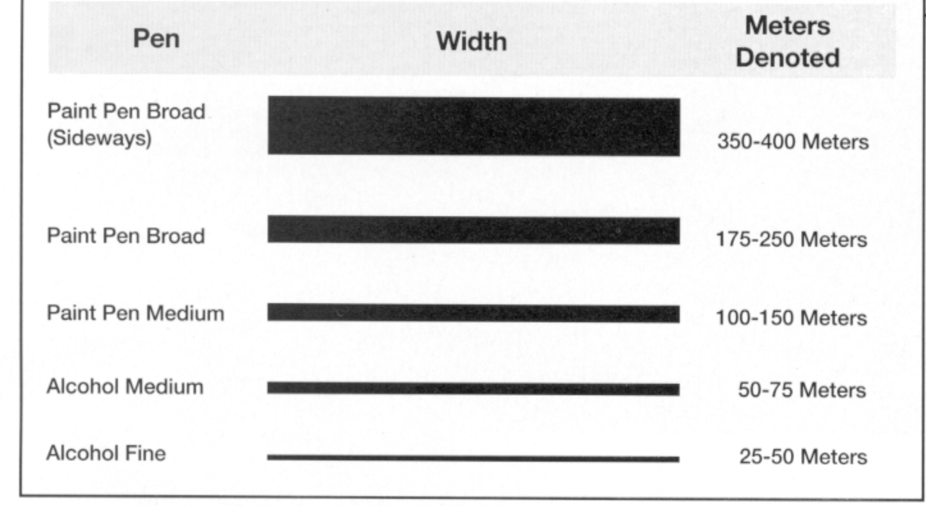

Figure 5: Pen Widths to Scale for 1:50,000 Map. Points underneath a swath of black paint on overlays are ill-defined and almost impossible to efficiently clear. If you must use a wide pen, draw the graphic first with superfine and then trace over the top of the original line, keeping the wider pen centered at all times.

superfine and then trace over the top of the original line, keeping the wider pen centered at all times. Graphics held to these standards are recognizable at a glance for their detail.

6. Excessive Complexity. This is like pornography—hard to define, but you know it when you see it. A series of on-order CFLs and boundaries is more complex than a series of phase lines that can serve multiple purposes. Feedback on planning at the Combat Training Centers (CTCs) is consistent: simple plans executed well are better than complex plans fraught with coordination or synchronization problems. The more complex the plan, the more likely it is that any of the fundamental errors will develop. Simple graphics are easy to coordinate and fight.

Conclusion. No checklist or system of review can ensure flawless graphics or a quality plan. A clear understanding of these six fundamental errors, however, can focus the commander and his fire support counterpart on potential problems in the graphical portrayal of the plan. If the plan is simple and the graphics are clear, it follows that the coordination of fires will be just as straightforward.

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Running ARSS on DOS Higher than 5.1

The automated range safety system (ARSS) fielded in 1992 is great for computing artillery safety data and will print out the safety overlay and safety T. It's draw backs are that it won't work with a DOS higher than 5.1 and it won't print properly on any printer other than a dot matrix.

ARSS will run on the lightweight computer unit (LCU) or a personal computer (PC) with a higher DOS, but you must install the system as outlined in this article.

Warning: Never introduce floppy disks into the LCU that have not been checked for viruses.

Warning: Ensure that applications remain on the floppy disk and are not saved to the hard disk drive.

Using ARSS on the LCU

This process requires two, 3-1/2-inch disks; one must be high density.

1. Make Disk #1 bootable from DOS 5.1.
2. For the high density Disk #2—
    - a. Install ARSS on a computer that has DOS 5.1 or lower.
    - b. Install impact areas as outlined in the ARSS user's manual. (You also may define impact areas once you have the ARSS running on the LCU.)
    - c. Copy Sort.EXE (from DOS 5.1) into the ARSS400\ARSS subdirectory.
    - d. Copy ARSS from the hard drive onto Disk #2.
3. The LCU requires a one-time preparation to ensure you can boot from the A drive. You—
    - a.Turn off the LCU and remove the hard drive.
    - b. Turn on the LCU.
    - c. Key in [CTRL]—[ALT]—[S]
    - d. At Extended Bios Features, hit Return.
    - e. Quick Boot should = No.
    - f. Escape, save and exit.
    - g. Turn off the LCU.
    - h. Put the hard drive back in.
4. To run ARSS on the LCU—
    - a. Boot the computer with Disk #1 (bootable).
    - b. At the A:> prompt, insert Disk #2 (ARSS) and type "CD ARSS400"
    - c. At A:\ARSS400>, type "ARSS"

Running ARSS on a PC

1. Once you have your two program disks (bootable and ARSS), the procedure are the same on a regular PC.
    - a. Boot the computer with Disk #1.
    - b. At the A:> prompt, type "CD ARSS400"
    - c. At A:\ARSS400> type "ARSS"
2. Backup your impact areas onto a separate disk.

If you have questions about or problems with these two methods to run ARSS, call the Concepts and Procedures Branch of the Gunnery Department at DSN 639-5523 or commercial (405) 442-5523.

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